GDP SPACE SYSTEMS

ACROAMATICS
TELEMETRY SYSTEMS

New Dual PCIe Telemetry Decom Processing Cardset
Model 1632AP

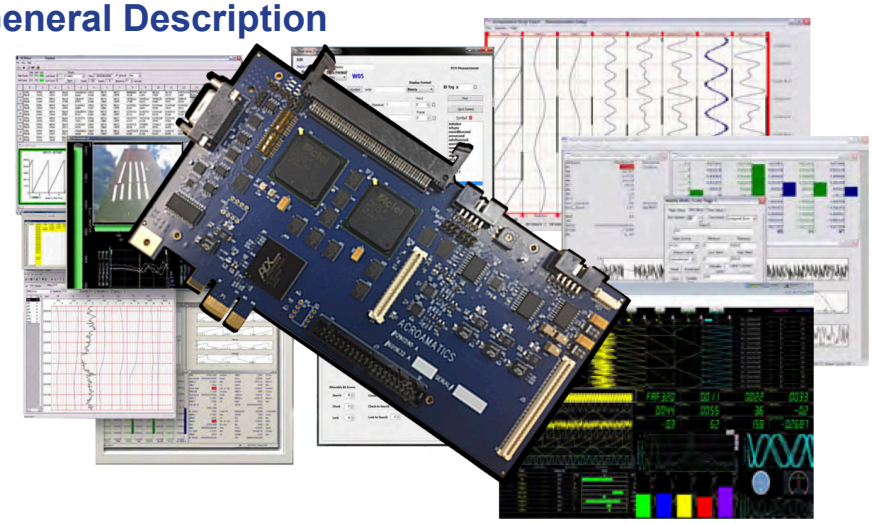
Features:

- Dual Stream Third Generation 0-72 Mbps PCIe, Half Length “all-in-one” PCM Decom Processor
- State-of-the-art modular Bit Sync, CH 4 Class 2 Decom, IRIG Time & Sim in a single PCIe card
- Compliance with IRIG 106 Chpt 4 (class 1 & 2), CVSD, Chpt 8, Chpt 9, Chpt 10 & CCSDS in streaming, burst, & packetized forms
- DOD STIG compliant OS agnostic card embedded dynamic “soft-decom” processors
- Supports multi-card PCIe, 1 to 8 stream system configurations
- Upgraded companion Model 1615AP PDSP 6MD/sec EU processor module
- Decom card embedded “data-driven” deterministic decommutation and output data formatting - display, recording, & playback
- Acroamatics GUI Telemetry System Software (ATSS) *included* - Lifetime Support included - no charge!
- Native support for 3rd party display, analysis, and instrumentation support software such as IADS, DeweSoft & ILIAD
- IRIG Ch 10 format file export & import 0-72 Mbps Programmable PCM Simulator & Stream Reconstructor
- NASA CCSDS & packet TMoIP & DQE encoded stream compatible decom & system EU processing

ILIAD LabVIEW ACRO TOPSET MATLAB IADS

IRIG 106 2017 Chapter 4, 5, 7, 8, 9 & 10
NASA CCSDS CVSD **TMATS**

General Description



The new Dual Channel PCIe Model 1632AP multi-function telemetry data processing module features the fastest end-to-end decom processing speeds in the industry - yet supports data format and mission project set-up interchange with existing Acroamatics PCI TDP products and systems. Utilizing the latest in FPGA component technology, the new Model 1632AP dual channel telemetry processing card provides increased decom & stream processing rates while consuming less power (1/3 that of the preceding generation) and delivering improved functionality.

The 1632AP employs real-time, deterministic card embedded stored program processing technology, supporting real-time decommutation of multiple software program driven sub, super, and asynchronous embedded framed TM streams – with support for dynamic conditional format switching and user defined conditional data product generation in its multiple onboard memory stored program locations. Once loaded and initialized, the new 1632AP PCIe decom operates wholly independent of its host Windows chassis administrative OS and is designed to employ standard Windows services to independently record data to disk, directly drive local quick-look display processes, and deterministically support directly coupled networked data services connections - making it the most effective standalone all-in-one card level telemetry processing device on the market today.

As part of an integrated multi-card / low latency real time telemetry processing system, up to four independent 1632AP cards are able to be joined together (via dedicated 64-bit I- Bus) with our powerful Model 1615AP EU processing card using provided ATSS system software.

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Bit Synchronizer

Model 474DM (Option - companion mezzanine module to Model 1632AP)

PCM Signal Inputs

Source	Two each analog baseband user selectable PCM inputs - #1 single ended, #2 RS-422
Isolation	Greater than 60dB at 20MHz
Impedance	Program selectable: Hi-Z/Lo-Z. Single Ended: 4kΩ/75Ω, Differential: 10kΩ/150Ω
Signal Level	Single Ended: 0.2-20V P-P, Differential: 0.2-10V P-P
DC Offset	20V max Hi-Z
PCM Codes	Program selectable: NRZ-L/M/S, Biø-L/M/S, DBiø-M/S, DM-M/S, MDM-M/S, RZ
Derandomizer	Program selectable: RNRZ 9/11/15/17/23, forward/reverse

Synchronization

Bit Rate Range	8bps - 72 Mbps NRZL, 8 bps - 44 Mbps Biø Codes
Capture Range	3 times the programmed loopwidth, typical
Loop Bandwidth	0.1% to 3.2%, program selectable in 0.1% increments
Sync Threshold	0dB for NRZ-L and Biø-L codes
Sync Maintenance	(LW=0.1%) –2dB NRZ-L and Biø-L codes
Sync Acquisition	(LW=1.6%, SNR > 12dB) Typically less than 32 bit periods
Sync Retention	(LW=0.1%, SNR > 3dB) Retains sync through > 1028 + consecutive dropouts, all modes
Bit Error Rate	(LW=0.1%) to within 0.25 to 0.50 dB of ideal bit error rate performance curves, absolute (not average) in all modes

Real Time PCM Frame Sync/Decommutator

Model 1632AP Card Embedded Dual Channel Low Latency Frame Sync, Decom, and Output Data Formatter

PCM Input

PCM Input Sources	To four program selectable clk/data inputs supported for each decom channel. TTL NRZ-L Data and 0º Clock. When configured with optional Model 474DM bit sync a fifth program selectable internal bit sync input path is provided.
Impedance	50 Ohm input impedance, TTL compatible.
Bit Rate	From 0 to 72 Mbps, burst, jam, and streaming mode compatible
Polarity	Programmable, automatic polarity correction.
Word Length	Programmable, 1 to 32 bit word length for each input.
Word Orientation	Programmable, MSB/LSB orientation for each input word.
Parity	Selectable leading, trailing, or no parity checking for each word.

Synchronization

Mainframe Sync	Provides for programmable sync pattern and mask, complement pattern recognition, and variable length frame decommutation. The pattern may be up to 64 bits in length.
Subframe Sync	Six independent synchronizers (per decom channel) are capable of decommutating sub-frames within subframes. Subframes synchronize to fixed recycle patterns, complement frame sync patterns, and various ID patterns.
ID Sync	Both recycle and ID patterns may be assembled from multiple word locations. Recycle patterns may be up to 32 bits long. Two types of ID synchronization are supported: JAM patterns of arbitrary values, and incrementing or decrementing frame counters with limit checking. ID sync words may be up to 16 bits in length.
Sync Strategy	Programmable Search-Check-Lock sync strategy, bit error tolerance, and bit slip window provide reliable frame synchronization.
Asynchronous Formats	Subframe synchronizer may be programmed to decommutate embedded formats having unique frame sync patterns and format structures.
Format Switching	16 testable flags store the results of select input stream bit and word comparisons to control real-time format switching. Frame Sync / Decom format switching is loss-less and immediate. Multiple card resident micro-coded decom processing programs are stored in local decom memory in support of such conditional format switching events.

Outputs

Standalone Data Output	Data is available to the host computers PCI bus as memory-mapped frame buffers, Current Value Table (CVT), or as a data stream selectably transferred by PCI bus DMA independently from each decom channel. Data is 32 bits with programmable MSB/LSB output word justification, sign extension, or zero insertion for LSB output. Acroamatics Telemetry System Software (ATSS) suite provides a host of Windows compatible (XP and Windows 7 compatible) which support user decom set-up, mission set-up management, and a host of real-time data display, alarming, recording, discrete/analog, and networked data I/O processes and local operator status display, and remote system management and data operations support.
I-Buss Data Output	When used in a system configured with additional 1632AP and PCI 1615AP PDSP EU & Distribution card, the messages containing thirty two bits of data, twelve bits of fine time (microseconds), two bits of status, and 17 bits of data identification. I-bus data can be formatted in either MSB or LSB justified form. LS-justified data can also be sign extended. I-bus timing and decom data is shared in real-time with other I-bus connected cards to insure deterministic time coherent extended decom and EU processing. The 1615AP PCI module is capable of merging data from any of up to four 1632AP cards in a system to support single file merged “raw” and EU multi-stream data recording and formatted data distribution of data from up to 8 high rate TM streams, supporting display and networked data communications processes. Decom and bit sync data quality status words are shared for downstream data validation and real-time TDP system status reporting.
2 Serial PCM Outputs	Two programmably controlled serial outputs, one per Model 1632AP PCM decom channel.

Dual PCM Simulator/Encoder

Model 1632AP Card Embedded User Programmable 1 bps - 72 Mbps PCM Simulator/Encoder

PCM Programmable PCM Format Simulator/Encoder Functions

Format Storage	Each PCM Simulator stores two complete, selectable PCM formats. Performs asynchronous frame insertion and format switching
Subframe Capability	Generates up to three subframes within mainframe. Generates subframe within subframe
Frame Length	Each PCM simulator supporting programming and generation of formats of up to 65,536 words for the mainframe and 16,384 per subframe
Data Sources	1M unique user programmable fixed value word registers, and 64 K unique dynamic function word registers, with two 16-bit module up/down counters, two 16-bit external inputs, one 16-bit pseudo-random number generator, and one 16-bit program counter are provided for use with each of two complete user-defined onboard stream simulation memories, for each of two PCM simulators in a dual stream Model 1632AP card.
Word Length	Programmable for each data source: static data words 1 to 32 bits; all others 1 to 16 bits
Word Orientation	Program selectable: MSB/LSB for each data word
Parity Generation	Program selectable: leading, trailing, or no parity for each data word
Dynamic Data Memories	2 unique, user-defined RAM's. Presettable to ramp, sine, triangle and squarewave functions or user-defined input functions. Selectable data type: 1's complement, 2's complement, signed magnitude, offset binary. Programmable time base.

PCM Outputs

Bit Rate	Program selectable: 1 bps to 72 Mbps, tunable to 0.1% of programmed rate
Clock	0º clock
Data	NRZ-L
Output Codes	Program selectable: NRZ-L/M/S, Biø-L/M/S, DBiø-M/S, DM-M/S, MDM-M/S, RNRZ 11/15/17/23
PCM Output	TTL compatible NRZ-L data and 0º clock

IRIG Time Code Reader/Generator

Integrated IRIG Time Code/Reader/Generator/Translator, one per Model 1632AP card. Shared in multi-card system applications via "I-bus" card interconnect

IRIG Time Code Reader/Generator/Translator

Amplitude	0.5 to 20 Vpp, Single-ended
Impedance	12K Ohms minimum
Input Codes	Translates IRIG G, A, B, & NASA-36
Input Frequency	125 Hz to 400,000 Hz
Modulation Index	2:1 through 5:1.
Polarity	Program selectable, Invert or Normal Polarity
Internal	Time Base 40MHz crystal oscillator

Operational

Generate Mode	Time is generated from the onboard crystal oscillator and is pre-settable from the Host.
Translate Mode	Time is read from an external source.
Translate Carrier Mode	The internal timing is based on the input carrier. This mode enables the system to translate time as the input carrier rate varies during playback of an analog recording
Translate Failsafe Mode	The internal timing is phase-locked to the input carrier. In the event of time dropout, the translator continues generating time without interrupt.
Frame Bypass	Automatic frame bypass compares previous time frame with current one, and Time Accumulator updates when they agree

*Subject to change without notice.

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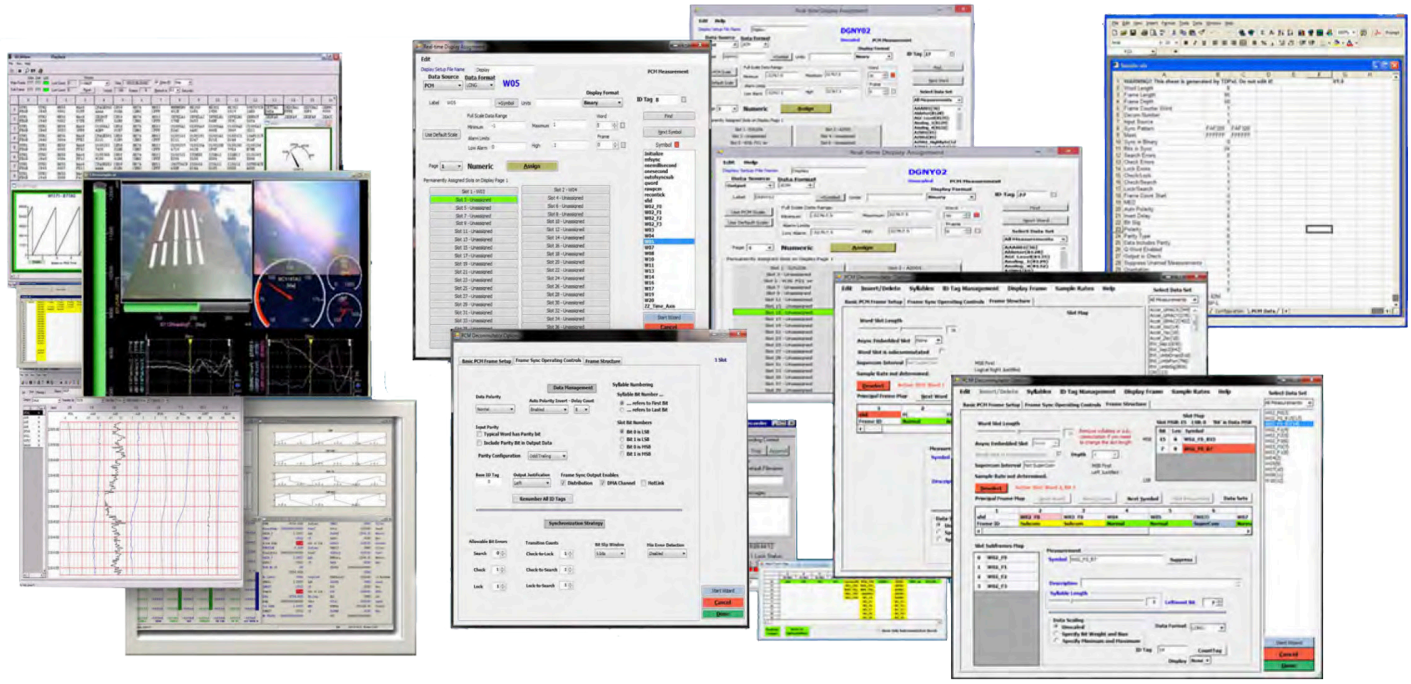
System Software

Acroamatics Telemetry System Software (ATSS)

Setup, Operations, Data Services, Display and Analysis, and Remote Operations Support

Processing Environment	Real-time,Windows OS independent processing. Dynamic “Change on the Fly” capable conditional format switching. Embedded PCI Module based “soft decom” on functionally dedicated, card based micro-coded processors
Standards Compliant	IRIG Chapter 4, 5, 7, 8, 9 and 10 compatible TMATS Import, NASA CCSDS, CVSD, integral IADS Data Services, LabVIEWS and Matlab.
Data Display Types	Scalable multi display/page, 32 pages -Horizontal and vertical strip chart, tabular, bargraph, annunciator, controls / meters, each with dynamic limit checking, alarming, scalable, parameter and E/U annotation.
Data Recording	The ATSS Data Recording Client provides local operator control of the 4022 CTS record function, and can operate as a standalone application or in conjunction with ATSS software managed real-time telemetry processing operations.
Networking	The Model 1632AP supports both networked system set-up and operation admin and real-time data communications. ATSS Remote operations software ($225 option) provides remote users all functions offered to the local user, including data recording, data display, system status and set-up GUI applications.



Options

Tunable Bit Synchronizer	The Model 474DM 8 Hz to 72 Mbps Advanced PCM Bit Sync Mezzanine Module may be ordered with or added to the 1632AP.
DeweSoft Client Display/Analysis	Provides an affordable integrated standalone (independent of core Acroamatics software/hardware) Windows application software driven local or networked real-time and post mission display, analysis, and independent select data logger toolkit

Physical

Format	Standard PCIe X1 format, Half Length
Cooling Requirements	30 Linear FPM
Power Requirements	+3.3VDC at < 1.0 Amp + 12 VDC at 0.10 Amps, (opt. mezzanine bit sync, TMoIP, PDSP modules not incl.)
Dimensions	4.20” (10.67cm) H x 6.9” (17.53cm) W x .55” (1.4cm) D
Temperature	Operating: 0º to +40º C, Non-Operating: -40º to +86º C
Relative Humidity	Up to 90% non-condensing
Shock	Operating: 6G, Non-Operating: 50G
Vibration Operating	0.5G, 5 to 2000Hz, Non-Operating: 1.2G, 5 to 500Hz

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